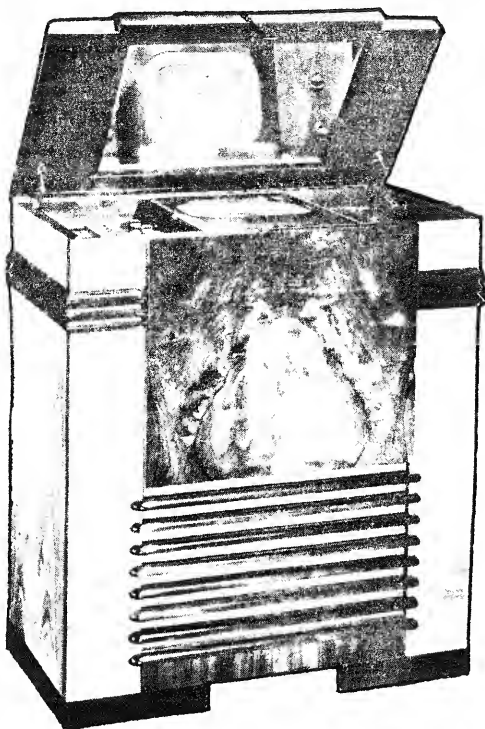
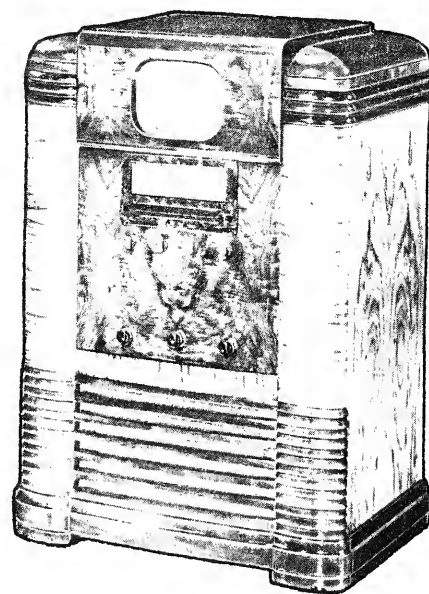


MODELS TRK-9, TRK-12, TRK-90 and TRK-120

AC, Superheterodyne, High-Picture-Definition, Five-Television-Channel, Receiver
and
Three-Band, Electric Tuning, AC, Superheterodyne Broadcast Receiver



Models TRK-12, TRK-120



Models TRK-9, TRK-90

TRK-9, TRK-90 General Specifications TRK-12, TRK-120

Height..... 47½ in.; Depth..... 24⅞ in.
Width..... 31½ in.; Weight..... 200 lb.
Shipping Weight..... 283 lb.

Height..... 40⅞ in.; Depth..... 19⅞ in.
Width..... 34⅞ in.; Weight..... 198 lb.
Shipping Weight..... 275 lb.

Chassis Numbers and Power Supply Ratings

Model TRK-12:

Chassis KC-4, KK-7, RC-427, RS-83E,
105-125 volts, 60 cycles..... 420 watts (total)
Chassis KC-4B, KK-7D, RC-427, RS-
83E, 105-125 volts, 50-60 cycles.... 420 watts (total)

Model TRK-120:

Chassis KC-4F, KK-7F, RC-427F, RS-
83E, 105-125 volts, 60 cycles..... 420 watts (total)
Chassis KC-4J, KK-7J, RC-427F, RS-
83E, 105-125 volts, 50-60 cycles.... 420 watts (total)

Model TRK-9:

Chassis KC-4A, KK-7A, RC-427A, RS-
83E, 105-125 volts, 60 cycles..... 420 watts (total)
Chassis KC-4C, KK-7E, RC-427A, RS-
83E, 105-125 volts, 50-60 cycles.... 420 watts (total)

Model TRK-90:

Chassis KC-4H, KK-7H, RC-427G, RS-
83E, 105-125 volts, 60 cycles..... 420 watts (total)

General Description

Models TRK-12 and TRK-120 are console-type, high-picture-definition, mirror-viewing, five channel, Television Receivers and three-band broadcast radio receivers enclosed in handsomely styled modern cabinets. Features of the Television receiver include: Twelve-inch Kinescope; Styrol (humidity-resisting) r-f and i-f transformer forms; black and white pictures; single station selector switch; temperature compensated condensers; iron core i-f and r-f tuning; double

safety switch protection; safety-glass viewing shield; and extra large viewing mirror for wide angle viewing.

Models TRK-9 and TRK-90 are direct viewing, high-picture-definition, console-type, five channel, Television Receivers and three-band broadcast radio receivers in deluxe upright modern cabinets. Television features of these receivers are the same as for the TRK-12 and TRK-120, except that a nine-inch Kinescope is used.

TELEVISION RECEIVER

Electrical Specifications

RCA TUBE COMPLEMENT

In KC-4, KC-4B (TRK-12) and KC-4A, KC-4C (TRK-9) Video Chassis:

- | | |
|---|--|
| (1) RCA-6AC7/1852..... 1st Det. | (13) RCA-6SK7..... 1st Sound I.F. |
| (2) RCA-6J5..... Oscillator | (14) RCA-6AB7/1853..... 2nd Sound I.F. |
| (3) RCA-6AB7/1853..... 1st Pix. I.F. | (15) RCA-6H6..... Sound 2nd Det.-AVC |
| (4) RCA-6AB7/1853..... 2nd Pix. I.F. | (16) RCA-6N7..... 1st Sync. Sep.-Amp. |
| (5) RCA-6AB7/1853..... 3rd Pix. I.F. | (17) RCA-6Y6-G..... 2nd Sync. Sep. |
| (6) RCA-6AB7/1853..... 4th Pix. I.F. | (18) RCA-6N7..... Sync. Amp. |
| (7) RCA-6AC7/1852..... 5th Pix. I.F. | (19) RCA-6N7..... Hor. Osc. Discharge |
| (8) RCA-6H6..... Pix. 2nd Det. | (20) RCA-6L6..... Hor. Output |
| (9) RCA-6F8-G..... AVC or Limiter | (21) RCA-5V4G (60 cycles) or |
| (10) RCA-6AC7/1852..... Video Amp. | RCA-25Z6 (50 cycles)..... Hor. Damping |
| (11) RCA-6H6..... D.C. Restorer | (22) RCA-6N7..... Vert. Osc. Discharge |
| (12) RCA-12AP4/1803-P4 (TRK-12) or | (23) RCA-6J5..... Vert. Output |
| RCA-9AP4/1804-P4 (TRK-9)..... Kinescope | |

In KK-7, KK-7D (TRK-12) and KK-7A, KK-7E (TRK-9) Television Socket Power Units:

- | | |
|---|--|
| (24) RCA-5T4..... Low Voltage Rectifier | (25) RCA-2V3-G..... High Voltage Rectifier |
|---|--|

In KC-4F, KC-4J (TRK-120) and KC-4H (TRK-90) Video Chassis:

- | | |
|--|--|
| (1) RCA-6AC7/1852..... 1st Det. | (12) RCA-6SK7..... 1st Sound I.F. |
| (2) RCA-6J5..... Oscillator | (13) RCA-6AB7/1853..... 2nd Sound I.F. |
| (3) RCA-6AB7/1853..... 1st Pix. I.F. | (14) RCA-6H6..... Sound 2nd Det.-AVC |
| (4) RCA-6AB7/1853..... 2nd Pix. I.F. | (15) RCA-6N7..... 1st Sync. Sep.-Amp. |
| (5) RCA-6AB7/1853..... 3rd Pix. I.F. | (16) RCA-6Y6-G..... 2nd Sync. Sep. |
| (6) RCA-6AB7/1853..... 4th Pix. I.F. | (17) RCA-6N7..... Sync. Amp. |
| (7) RCA-6AC7/1852..... 5th Pix. I.F. | (18) RCA-6N7..... Hor. Osc. Discharge |
| (8) RCA-6H6..... Pix. 2nd Det. | (19) RCA-6L6..... Hor. Output |
| (9) RCA-6SQ7..... Limiter | (20) RCA-5V4G (60 cycles) or |
| (10) RCA-6AC7/1852..... Video Amp. | RCA-25Z6 (50 cycles)..... Hor. Damping |
| (11) RCA-12AP4/1803-P4 (TRK-120) or | (21) RCA-6N7..... Vert. Osc. Discharge |
| RCA-9AP4/1804-P4 (TRK-90)..... Kinescope | (22) RCA-6J5..... Vert. Output |

Note: An RCA-6H6 D.C. Restorer is added in some TRK-120, TRK-90.

In KK-7F, KK-7J (TRK-120) and KK-7H (TRK-90) Television Socket Power Units:

- | | |
|--|--|
| (23) RCA-5U4G (60 cycles, without D.C. Restorer),
RCA-5T4 (60 cycles, with D.C. Restorer), or
RCA-5T4 (50 cycles)..... Low Voltage Rectifier | (24) RCA-2V3-G..... High Voltage Rectifier |
|--|--|

TELEVISION CHANNELS (Selector Switch Positions)

- | | |
|---------------------|---------------------|
| 1..... 50 to 56 mc. | 3..... 66 to 72 mc. |
| 2..... 60 to 66 mc. | 4..... 78 to 84 mc. |
| 5..... 84 to 90 mc. | |

PICTURE SIZE (Approximate Mask Dimensions)

- | |
|--|
| TRK-9, TRK-90..... $5\frac{1}{2}$ x $7\frac{1}{4}$ in. |
| TRK-12, TRK-120..... $7\frac{3}{8}$ x $9\frac{3}{4}$ in. |

NOTE: This service note includes all changes that have been incorporated since initial production, including deletion of the 44-50 m.c. channel and addition of the 60-66 m.c. channel.

- | |
|---|
| Overall Video Band Width..... 4 mc. |
| Scanning..... Interlaced, 525 line |
| Horizontal (Line) Scanning Frequency
(Sawtooth Wave)..... 15,750 cps |
| Vertical (Field) Scanning Frequency
(Sawtooth Wave)..... 60 cps |
| Frame Frequency (Picture Repetition Rate)..... 30 cps |

IMPORTANT PRECAUTIONS

A good ground should be connected to the receiver at all times.

Always wear gloves and shatter-proof goggles when handling Kinescope tubes.

Do not eliminate the protection afforded by the interlock switches.

ALWAYS replace the shield can over the 2V3-G high voltage rectifier. The most dangerous portion of the H.V. supply is the plate lead of the 2V3-G tube.

Do not measure any voltages on the video chassis unless the primary leads of the high voltage trans-

former have been unsoldered from the supply line, and taped.

Use only one hand when working on the video or high voltage SPU chassis, and always connect a shorting lead to ground (first), then to the high side of both high voltage filter capacitors.

Make no voltage measurements on the high voltage (7,300 volts) SPU chassis.

Work on a television receiver should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high voltage equipment.

Precautions in Handling Kinescopes

The Kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For these reasons, Kinescopes must be handled with more care than ordinary receiving tubes.

The large end of the Kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck, scratched or subjected to more than moderate pressure at any time. If the tube sticks, or fails to slip into its socket or deflecting yoke smoothly, investigate and remove the cause of trouble. Do not force the tube.

All RCA Kinescopes are shipped in special cartons and should always be left in the cartons until ready for installa-

tion in the receiver. Keep the carton for future use.

The RCA-12AP4/1803-P4 (12-inch) Kinescope is equipped with a protective lid and shield. Do not at any time remove the close-fitting cone-shaped section of the protective shield from the Kinescope. This section should be installed with the tube in the cabinet and is designed to protect the user while handling the glass bulb.

CAUTION: Do not open the shipping carton, install, remove, or handle the Kinescope in any manner, unless shatter-proof goggles and heavy gloves are worn. People not so equipped should be kept away while handling Kinescopes. Keep Kinescope away from the body while handling.

Operation

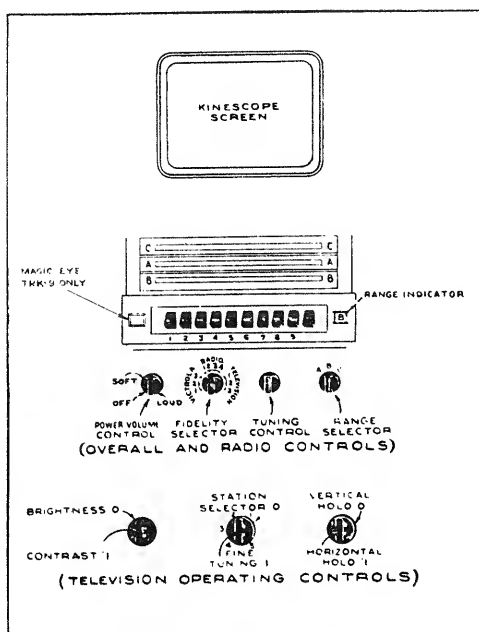


Figure 1—Operating Controls, TRK-9, TRK-90

The "Power-Volume" control on the radio receiver turns on the power for the complete receiver. The "Victrola, Radio, Television" control selects the type of operation desired. There are three Victrola fidelity positions, four radio fidelity positions and three Television sound fidelity positions on this switch. The furthestmost clockwise position being the highest fidelity position for Television sound.

Television Operation:

Station Selector and Fine Tuning.—The outer ring "O" section of the central dual control knob on the Television panel selects the station from which it is desired to receive Television transmissions.

Five Television channels are covered as follows:

- (1) 50 to 56 mc.
- (2) 60 to 66 mc.
- (3) 66 to 72 mc.
- (4) 78 to 84 mc.
- (5) 84 to 90 mc.

Set the station selector to the number corresponding to the frequency of the station from which it is desired to receive Television broadcasts.

The inner section "I" of this knob is used for fine tuning and may eliminate moving ripples or distortion if due to interfering radio signals.

Before the Television portion of the receiver is turned "ON" it is advisable to turn the Brightness and Contrast controls completely counter-clockwise to reduce the illumi-

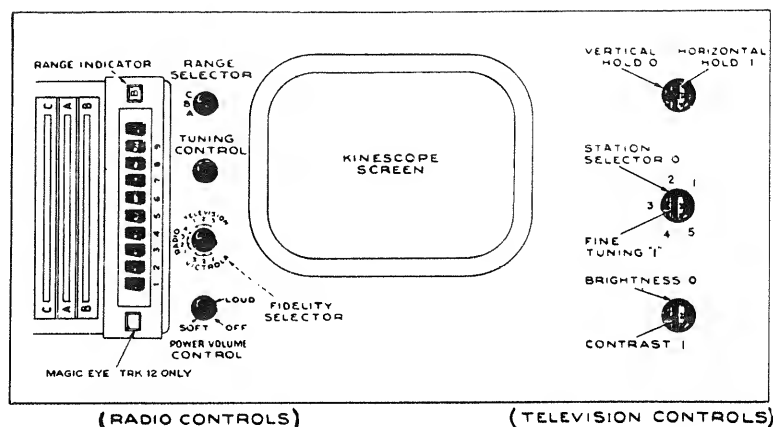


Figure 2—Operating Controls, TRK-12, TRK-120

nation of the spot which appears on the Kinescope before the sweep circuits have started functioning.

Contrast and Brightness Controls.—The inner "I" section of the "Contrast" "Brightness" controls is the "Contrast" control and varies the black and white tones of the picture being received. Too much contrast gives blurred details and a lack of half-tones, while too little contrast makes it all half-tones or grays. Turning clockwise increases contrast from grays, to black and white. See Operating Instructions for this receiver.

The outer ring "O" is the Brightness Control and affects the average illumination of the picture. Turning clockwise increases the brightness. See Operating Instructions for this receiver.

An approximate adjustment for proper contrast is to turn the "Contrast" control fully counter-clockwise, then turn the "Brightness" control until the screen is slightly illuminated. Then reduce the Brightness control just sufficient to make the screen dark, then bring up the Contrast Control until the picture appears. A slight further adjustment of the Brightness or Contrast control may be necessary in some cases. A slight readjustment of the contrast control may aid synchronization of the picture.

Hold Controls.—The dual knobs on the Television panel marked "Horizontal" and "Vertical" Hold, control the picture stability. The inner section designated by a "I" is the Horizontal Hold Control and when being set should be turned slowly to the point at which the picture "locks in" horizontally. See Operating Instructions for this receiver.

The outer ring section designated by "O" is the Vertical Hold Control and when being set should be turned to the point where the picture "locks in" vertically.

These two controls on this dual knob should not ordinarily require readjustment after good picture reception has once been obtained. An occasional resetting may be necessary due to changing to a different station, and to the gradual aging of the tubes.

SERVICE DATA

Kinescope Installation (TRK-9, TRK-90).

1. Remove back cover of cabinet.
2. Remove the two screws which secure the wooden block, on which the yoke is mounted, to the upper shelf, and drop this block and yoke away from the shelf.
3. Loosen the thumb screw in the center of the slotted block of wood on the top shelf, pull this block of wood towards the rear of the cabinet and turn it so that the "V" slot on the front end of the block is to your right.
4. Wearing gloves and goggles, carefully slide the Kinescope on the "V" in the block, and turn both the block and the Kinescope so that the Kinescope faces the viewing window. Slide the Kinescope up to the mask in the window and fasten loosely in place by sliding the "V" block up to the bottom of the Kinescope face, and fastening it with the thumb screw.
5. Place the yoke and the wooden block on which it is mounted, on the Kinescope neck, rotate the block 90° from its original mounting position in order to have it clear the top of the cabinet and slide it into position on the Kinescope neck. **DO NOT FORCE YOKE.** In some cases where the yoke lead is too short it may be necessary to loosen the "V" block and swing the Kinescope neck to the left in order to be able to place the yoke on the Kinescope neck without forcing.
6. Fit the upper part of the wooden yoke mounting block into the slot on the underside of the cabinet top and fasten the lower end of the block securely by means of the two screws. The Kinescope should be mounted loosely in place, so that the yoke is not forced on the Kinescope neck at any time.
7. Loosen the wing nuts on the yoke mounting bracket, and move the yoke forward on the neck of the Kinescope so that it pushes the Kinescope against the mask. Tighten the wing nuts to hold the Kinescope and yoke securely in this position.
8. It may be necessary to rotate the Kinescope, within the limits allowed by the high voltage second anode lead, with respect to the mask in order to obtain proper masking of the

edges on the Kinescope screen. Before rotating the Kinescope, the screws holding the yoke mounting block should be loosened, so that the Kinescope neck will not be forced.

9. Move the "V" block forward so that it holds the bottom of the Kinescope in place. Tighten the thumb screw.

10. Place the second anode lead on the second anode cap at the side of the Kinescope.

11. After the receiver is operating, and if the picture is not squared with the mask, using a screw driver loosen the clamping screws on the band around the yoke and rotate the yoke until the picture is squared with the mask, then tighten these clamping screws securely.

CAUTION: When removing the back cover of the cabinet, after the screws have been removed do not allow the cover to slide down on the neck of the Kinescope, or the neck of the Kinescope may be snapped off.

Kinescope Installation (TRK-12, TRK-120).—Refer to figure 4.

1. Remove back cabinet cover.
2. Remove the top safety glass cover by removing the three wing nuts "E" at the two front corners and right rear corner of the cover and loosening the wing nut "E" at the left rear corner of the cover.
3. Lift the cover straight upwards, taking care not to scratch the cabinet finish with the protruding screws or the cover itself.
4. Loosen the two wing nuts "F" on the yoke holding frame, and allow the yoke to drop down as far as possible.
5. Using gloves and goggles, open the Kinescope shipping carton and remove the top cover on the Kinescope.
6. Remove the Kinescope from the shipping carton (do not remove the close fitting cardboard shield from the Kinescope), and insert the Kinescope into the cabinet, guiding the neck of the Kinescope into the yoke. Do not force the neck of the Kinescope into the yoke, or the tube may break. Let the Kinescope down slowly so that it finally rests on the yoke.

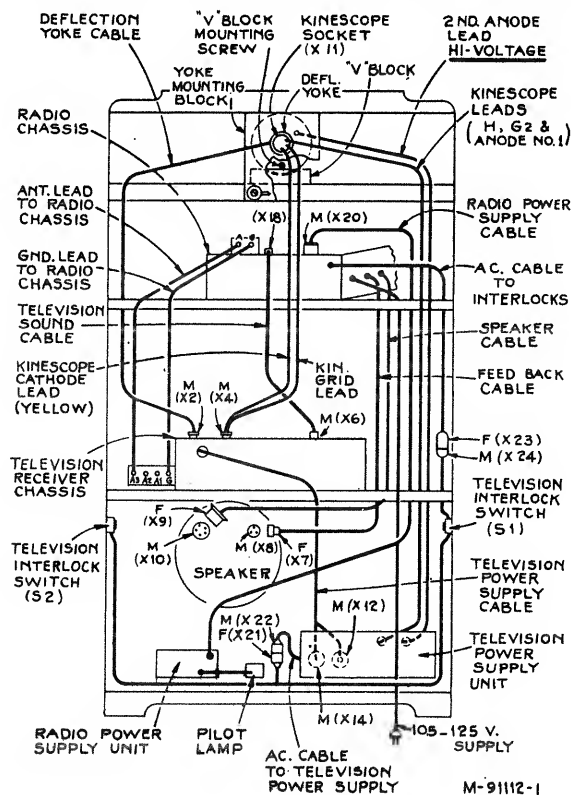


Figure 3A—Cabinet Wiring—Model TRK-9, TRK-90

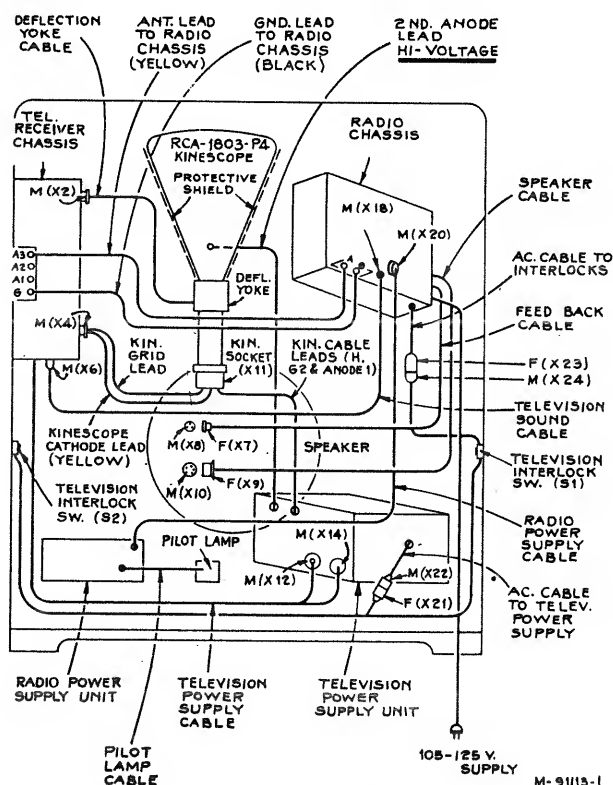
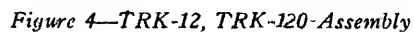


Figure 3B—Cabinet Wiring—Model TRK-12, TRK-120



TRK9, TRK90, TRK12, TRK120

7. Rotate the Kinescope and cardboard container (but not the yoke), so that the second anode cap at the side of the tube is towards the front of the cabinet.

8. Place the white rubber mask on the face of the Kinescope, with the ribs on the mask facing upwards toward the mirror. Line up the mask so that it masks the edges on the Kinescope face. Then, if necessary, lift the Kinescope and rotate it so the mask is approximately squared up with the cover opening. The second anode cap should be kept towards the front of the cabinet.

9. Replace the safety glass cover and wing nuts. Tighten wing nuts to hold the cover securely.

10. Loosen the wing nuts "F" on the yoke mounting bracket and push the two metal brackets, on which the bottom of the yoke rests, upward, until the rubber mask rests against the top cover. If the mask and the cover opening do not line up, rotate the cone-shaped Kinescope shield until they do. Tighten the wing nuts to hold the yoke and tube in this position. In some cases it may be necessary to loosen the four screws holding the yoke support to the wooden frame and shift the yoke support to make the mask and Kinescope

line up symmetrically with the cover opening.

11. Place the second anode lead on the second anode cap at the side of the Kinescope.

12. After the receiver is operating, and if the picture is not squared up with the cover opening, the two screws "H" on the band around the yoke should be loosened, and the yoke rotated to square up the picture, then these screws should be tightened with a screw driver.

Focusing Control.—This is a screw driver adjustment located on the right side of the cabinet near the base. On early production receivers, a knob located at the bottom, rear of the cabinet is the focus control.

Adjustments.—There are a series of screw driver slot adjustments at the rear of the TRK-12 and TRK-120 (at the side of the TRK-9 and TRK-90), used to obtain the proper picture size, centering, and vertical distribution. These adjustments are explained fully in the receiver operating instructions, and also in the booklet: "Practical Television by RCA."

When the receiver is moved from one location to another some readjustment of these controls may be necessary.

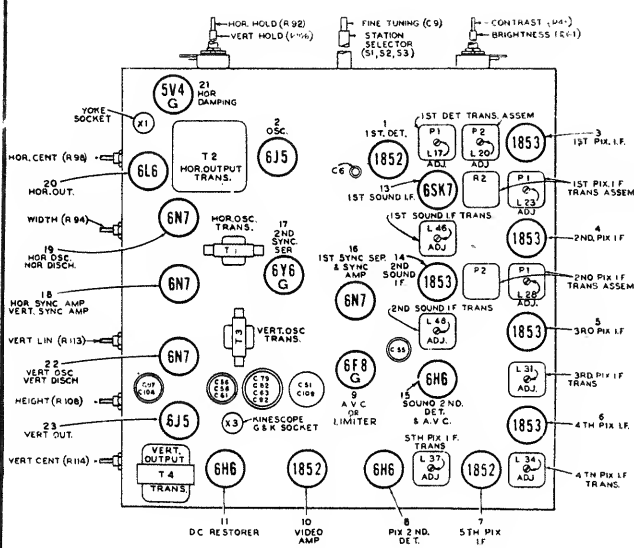


Figure 5A—Top View TRK-9, TRK-12 Video Chassis

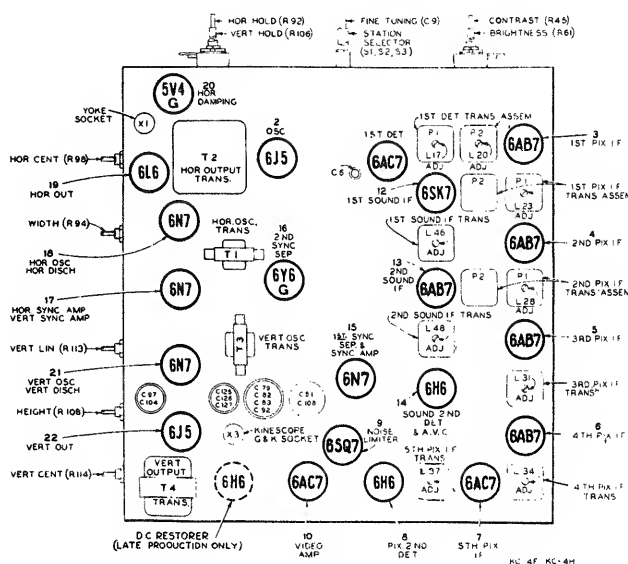


Figure 5B—Top View TRK-90, TRK-120 Video Chassis

Video Chassis

When it is desired to measure any voltages on this chassis, the primary leads of the high voltage transformer T6 (T9—50 cycle models) should be disconnected and taped together.

When any changes have to be made in the Video chassis, the lead and part locations should be replaced as closely as possible to the original positions.

Because of the special equipment and procedure necessary for the proper alignment of these receivers, the alignment will not be covered in this service note.

Refer to the booklet: **Practical Television by RCA**, for detailed explanations of circuit operation in a Television receiver.

Service Hints:

1. Poor Horizontal Distribution of the picture elements may be due to a 6L6 tube. RCA-6L6 tubes of known recent manufacture are the only tubes recommended for the Horizontal sweep output circuit. By careful scrutiny, these tubes can be identified by the three "rings" or sections welded to-

gether at the base ring of the tube, as shown in Figure 6. If any other 6L6 tube is used in this position it will break down in a very short time.

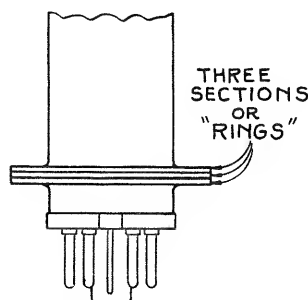


Figure 6—Recommended Type 6L6 Identification

2. If the picture "tears out" when the receiver is jarred it may be due to microphonic 6AB7/1853, 6AC7/1852 or 6J5 tubes.

3. The 6J5 oscillator tube should be removed without rocking it in its socket to loosen it, as the rocking motion may cause the 80.5 mmf capacitor to break off.

4. The coils in oscillator circuit should not be touched or moved or the alignment of the receiver will be disturbed.

5. The insulator on the filter capacitors may become dirty and break down to short out the high voltage.

6. The Video coupling capacitors C50, 53, 59 should be kept clear of chassis.

7. A gassy 2V3-G tube may cause resistor R-137 to burn. Replace 2V3-G tube, and resistor, if necessary.

8. Changing the position of the oscillator shield plate will disturb the alignment.

Television Socket Power Units

The following precautions should be observed when any work is being done on the SPU:

1. Remove power supply cord from the power supply socket.

2. No attempt should ever be made to measure the high (7,500 volts) voltage because of the difficulties and dangers involved. Servicing should be done with an ohm meter.

3. If, at any time it becomes necessary to service the SPU, the suspected parts should be replaced by parts known to be in good operating condition.

4. Use only one hand at a time. It is advisable to keep the other hand in one's pocket.

5. Connect a shorting lead between ground (first) and the high voltage side of C-113 and C-114 (C-121 and C-122 in 50 cycle models).

6. Whenever working with the oil-filled capacitors, keep a constant short across the capacitor, as these capacitors do not completely lose their charge after being discharged a single or several subsequent times.

7. Only one person at a time should work on the unit to prevent any misunderstanding which may result in an accident.

Antenna Installation

The finest television receiver built may be said to be only as good as the antenna design and installation. It is therefore important to use a correctly designed antenna, and use care in its installation.

In most cases, the antenna should not be installed permanently on the apartment or residence roof until the quality of the picture reception has been observed on a Television receiver. A temporary transmission line can be run between receiver and the antenna allowing sufficient slack to permit moving the antenna. Then, with a telephone system connecting an observer at the receiver and an assistant on the roof to find an antenna location, the antenna can be positioned to give the most satisfactory results on the received signal. A shift of only a few feet in antenna position or direction may effect a tremendous difference in picture reception.

Whenever possible, the antenna location should be chosen or erected so the antenna is not only broadside to the transmitter but removed as far as possible from highways, hospitals and doctors' offices and similar sources of interference. Auto ignition and diathermy apparatus may cause noise interference spoiling the picture.

In mounting any antenna, care must be taken to keep the antenna rods or pickup wires proper at least $\frac{1}{4}$ wave length (at least 6 feet) away from other antennas, metal roofs and

gutters or metal objects. Under certain extremely unusual conditions, it may be possible to rotate or position the antenna so it receives the cleanest picture over a reflected path. If such is the case, the antenna should be so positioned. However, such a position may give variable results as the nature of reflecting surfaces may vary with weather conditions, as a wet surface has been known to have different reflecting characteristics than a dry surface.

In short, a television receiving antenna and its installation must conform to much higher standards than an antenna for reception of International Short Wave and Standard Broadcast signals because:

(1) Intervening obstacles have a pronounced shielding effect on the ultra-high frequency waves producing low intensity signals. Severe trouble with multi-path transmissions may be experienced, especially in congested city areas.

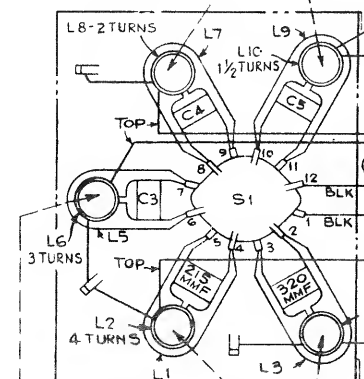
(2) The picture signal is comprised of a very wide band or range of frequencies, all of which must be received with good efficiency.

(3) It must be continually remembered that the discernment for the eye is much more critical than that of the ear.

For further information on antennas and antenna installation see RCA Booklet entitled: "Practical Television by RCA," and also the specific instructions accompanying the RCA Television Antenna.

ANTENNA ADJUSTMENTS

BAND 5 - 84-90 MC.
BAND 4 - 78-84 MC.



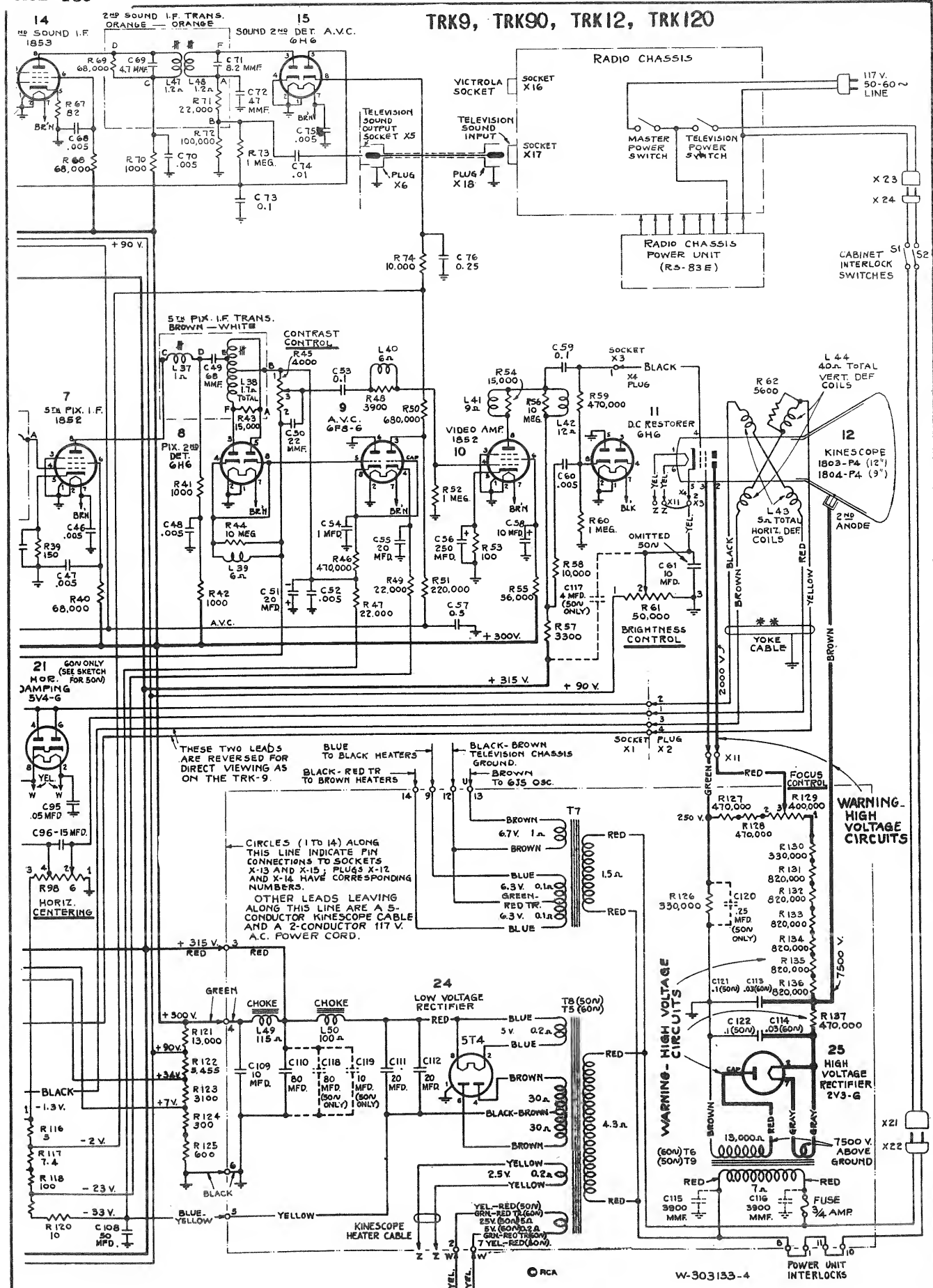
BAND 3 - 66-72 MC.
BAND 2 - 60-66 MC.
BAND 1 - 50-56 MC.

REAR VIEW OF
BAND SWITCH

OSCILLATOR ADJUSTMENTS

BAND 5 - 98 MC.
BAND 4 - 92 MC.
BAND 3 - 80 MC.
BAND 2 - 74 MC.
BAND 1 - 64 MC.

Figure 7—R.F.—Oscillator Unit Wiring and Adjustments



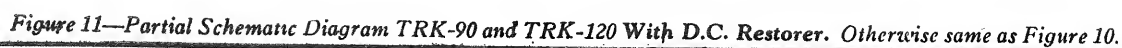


Figure 11—Partial Schematic Diagram TRK-90 and TRK-120 With D.C. Restorer. Otherwise same as Figure 10.

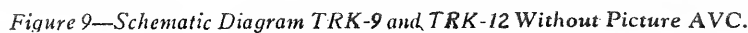
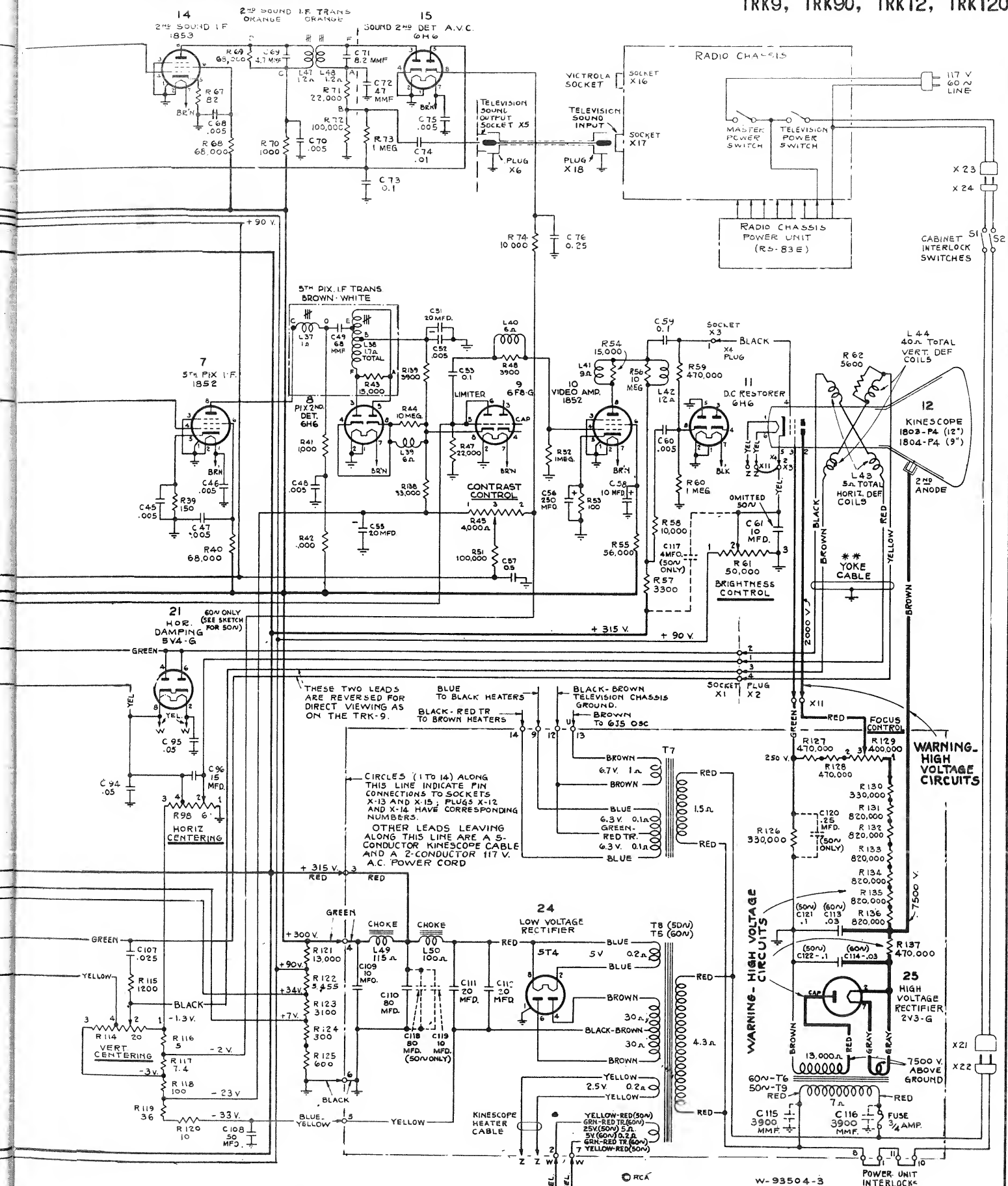


Figure 9—Schematic Diagram TRK-9 and TRK-12 Without Picture AVC.



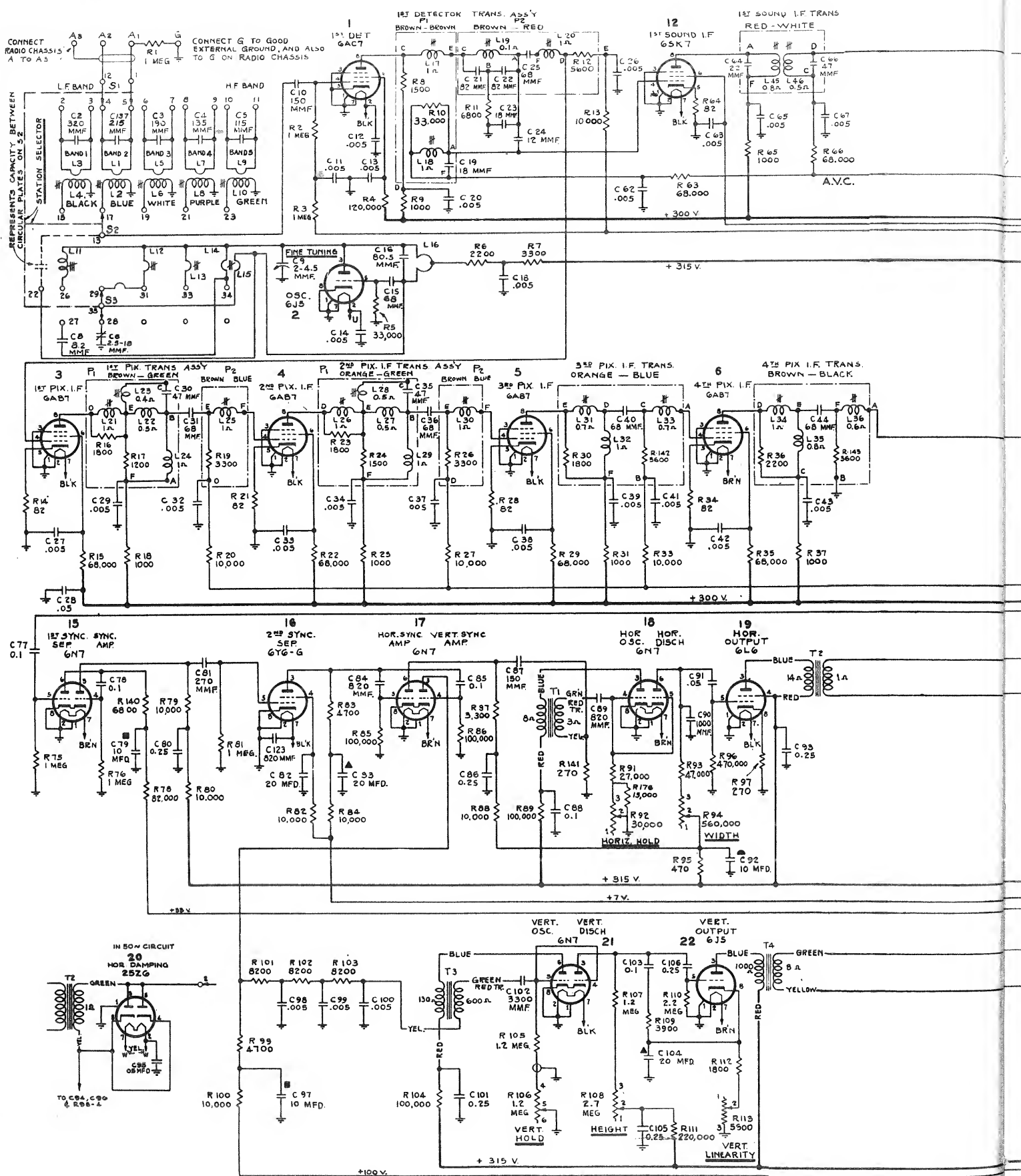
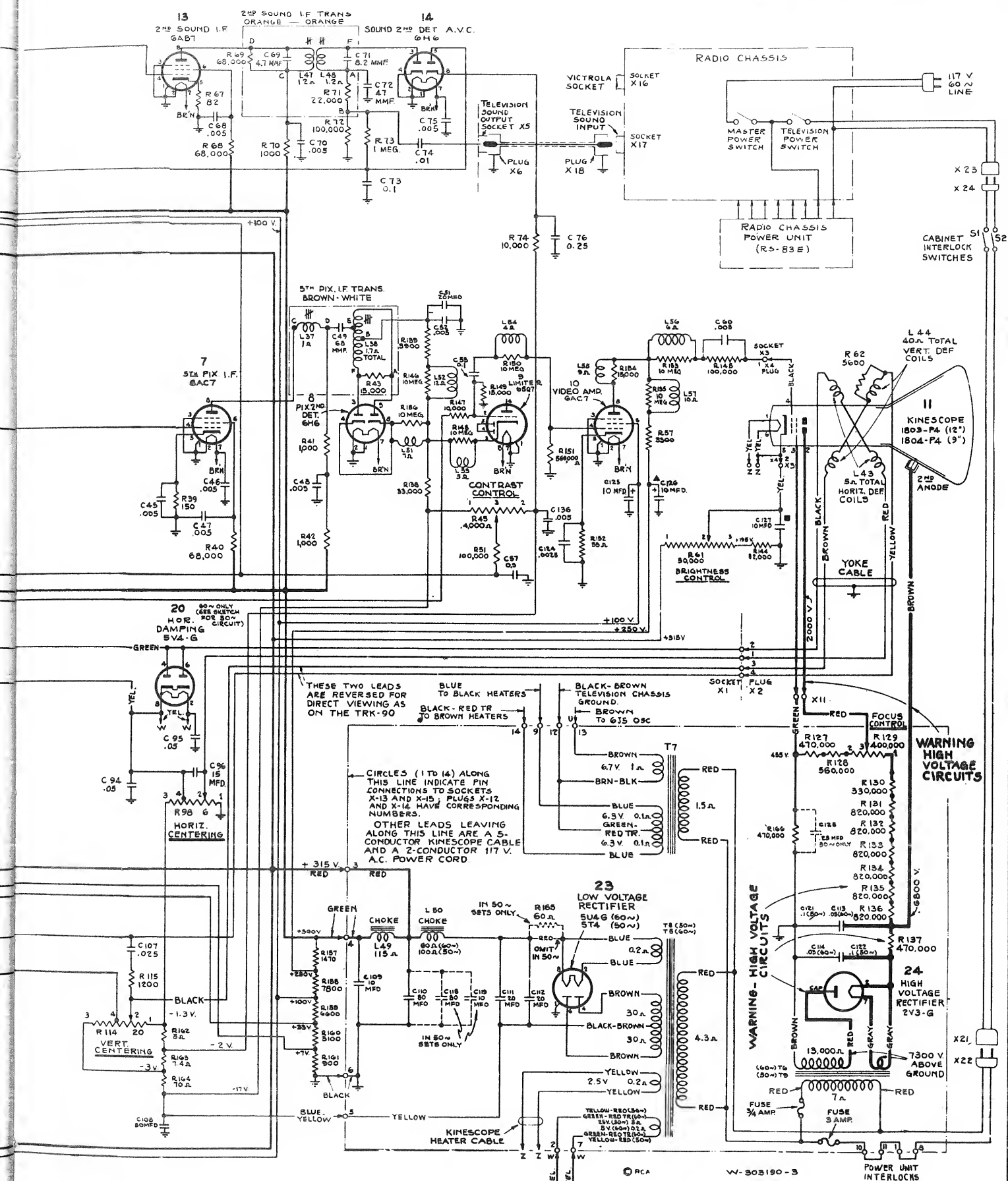


Figure 10—Schematic Diagram TRK-90 and TRK-120 Without D. C. Restorer.



Television Service Suggestions

Some of the possible troubles that may become evident during air-check of Models TRK-9, -12, -90, -120 are listed below, together with the most likely causes of each trouble, based on field experience.

1. Connect the receiver for operation, being certain that all cables are plugged in correctly, and that all tubes are seated down in their correct sockets.

2. **Blown fuse; shorted high-voltage rectifier.** Turn the set on. Look to see that the high-voltage rectifier lights. If it does not, check the fuse. A shorted rectifier will cause the $\frac{3}{4}$ ampere fuse to blow.

3. **Intensely bright round spot; no deflection.** If an intensely bright round spot appears on the Kinescope, and cannot be dimmed with the brightness control, turn the set off immediately. This indicates lack of deflection and lack of voltage across the brightness control. Check for—

(a) Defective low-voltage rectifier (5T4 or 5U4-G).

(b) Bent-over pins on the octal plug on cable from the video chassis to the SPU.

(Note that a bright spot may appear for several seconds if the receiver is turned on again too soon after it has been shut off. Avoid doing this.)

4. **Thin vertical line; no horizontal deflection.** If only a thin vertical line appears on the Kinescope when the brightness control is advanced, it indicates lack of horizontal deflection. Check the 6N7 horizontal oscillator and the 6L6 horizontal output tube.

5. **Thin horizontal line; no vertical deflection.** If only a thin horizontal line appears, it indicates failure of vertical deflection. Check the 6N7 vertical oscillator and the 6J5 vertical output tube.

6. **Excessive hum; defective high-voltage filter.** Turn contrast control fully counter-clockwise and adjust the brightness control to secure faint illumination of the raster. "Lock in" any residual hum by adjusting the vertical hold control. Normally the hum should be scarcely discernible. Excessive hum may be caused by a defective (low value) filter resistor R137 in the SPU, which in turn may be caused by a shorted 2V3-G high-voltage rectifier. Observe necessary precautions before checking the filter.

7. **No focus; off-value high-voltage resistors.** Adjust the focus control to secure sharpest lines on the raster. The individual lines can be seen most readily by turning the horizontal hold control to the lowest frequency (counter-clockwise). The lines should be in sharpest focus at one setting of the focus control. Inability to pass through a definite point of focus indicates incorrect voltages, which may be caused by off-value resistors in the SPU. Inability to focus may also be due to a defective Kinescope.

8. **Failure to lock-in; sync trouble.** Turn band switch to a channel that is in operation. Adjust the fine-tuning control for clearest sound, which should be at approximately half-capacity position. Turn contrast control full counter-clockwise. Turn brightness control until the Kinescope is faintly illuminated. Turn contrast control clockwise until the picture signal is evident. Lock in the picture horizontally and vertically. Adjust the contrast and brightness controls for best contrast.

If the picture will not lock-in horizontally or vertically, change the 6N7 and/or 6Y6-G sync tubes: Interchanging 6N7's may correct the trouble. Otherwise check the resistors, capacitors and voltages in the sync circuits. The capacitors should be checked for opens and leakage. Do not forget that advancing the contrast control too far on a strong signal will cause the picture to "tear" out of horizontal sync.

9. **"Smeared" picture or insufficient contrast.** There should be a jumper in the Kinescope socket between the cathode and one side of the heater. Omission of this jumper may cause "smearing" of the picture when the contrast control is advanced for good contrast.

Check for presence of the jumper with an ohmmeter, and insert one if necessary. Diagonals may be used to cut out a partition for the jumper, which should be solid wire. Avoid breaking the socket wafer.

10. **Picture folded back at left-hand side.** If the picture is lapped-over, or folded back on the left-hand side, change the horizontal damper tube.

11. **No picture; weak picture.** If the station's sound is received, it is an indication that the oscillator and first detector are functioning. Run an RF sweep into the antenna and check with a CRO for over-all response at the picture 2nd-detector load resistor. If there is no response, check the picture-IF tubes and circuits. If response at the load resistor is normal, remove the sweep and feed a 10 mc, 400-cycle modulated signal into the 1st-detector grid. Note the amplitude of the 400-cycle signal at the load resistor, and then shift the CRO back through the video stage to localize the point at which the signal disappears.

12. **Picture signal too strong; contrast control ineffective.** In sets where the contrast control is a manual bias control for the picture-IF amplifier (TRK-9 and TRK-12 without AVC; all TRK-90 and TRK-120), a grid short in one of the picture-IF tubes will cause the tubes to operate near full gain regardless of the setting of the contrast control. The defective tube can be found by using the VoltOhmyst to check grid voltages throughout the picture-IF amplifier. First turn the contrast control counter-clockwise and measure the voltage from the arm of the contrast control to the chassis. This should be approximately -17 volts for TRK-90 and TRK-120, or -23 volts for TRK-9 and TRK-12 without AVC. Normally, this same voltage should then exist at each picture-IF grid and at the 1st-detector grid. (The last picture-IF tube has fixed bias.)

The same trouble can exist in TRK-9 and TRK-12 receivers with AVC on the picture-IF amplifier, but in this case the contrast control is the picture 2nd-detector load resistor and the amount of picture signal into the video amplifier can be controlled. In both types of receivers, in normal signal areas, the absence of bias on the picture-IF amplifier will cause over-loading of the last picture-IF tube with resultant grid current and distortion in this tube, which will produce a voltage across the grid resistor of this tube. In normal operation, there should be no grid current and therefore no voltage across this resistor. The VoltOhmyst can be used to check for presence of voltage.

Grid shorts can usually be located by tapping each tube very gently, or by changing one tube at a time. Shorts in '52 or '53 tubes can sometimes be cleared by tapping the base of the tube on a table, holding the tube in an upright position.

13. **Weak picture; insensitive receiver.** A simple sensitivity check can be made by removing the antenna from the receiver and turning the contrast control full clockwise with brightness control at normal position. This should produce some evidence of tube noise which will appear as speckles on the Kinescope raster. When the antenna is connected to the receiver, there should be more pronounced speckles due to random noise, streaks due to ignition interference from passing cars, and possibly hum lines that can be locked in vertically, due to sparking in 60-cycle circuits, diathermy, etc. Check each band for sensitivity. Noise conditions vary from band to band. Certain types of interference, such as diathermy, may exist in only one band and may be seen but not heard, or vice versa. Sensitivity can be estimated in this way, just as with an ordinary radio receiver, by observing the amount of noise and the strength of the weaker stations.

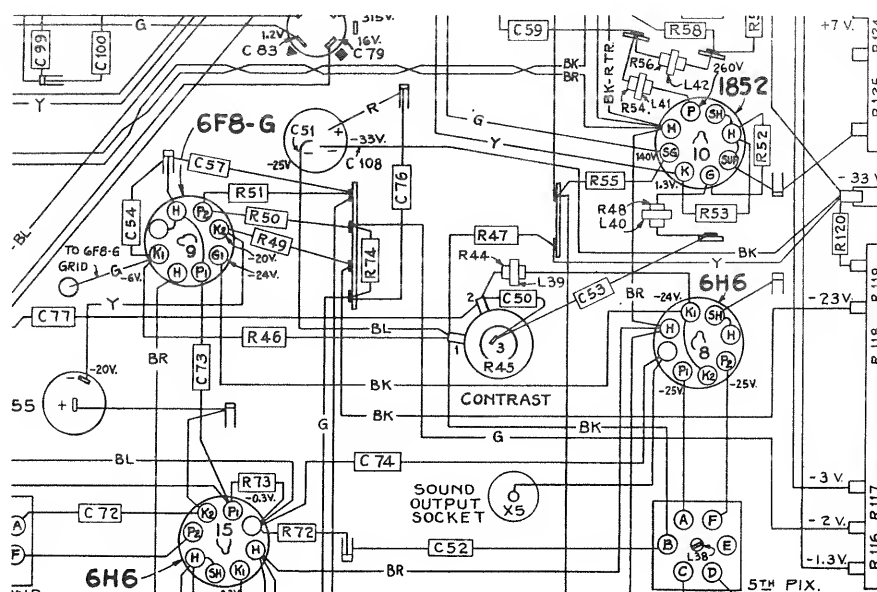
If the receiver is insensitive, check all tubes in the picture-IF amplifier and the 1st-detector by substituting a good tube in each socket. If the trouble is not due to tubes, it may be necessary to check the gain of each picture stage.

14. **Small picture size.** Adjust picture size, centering, and vertical linearity. Inability to secure a full-sized picture may be due to low-voltage on the 315-volt bus. Check the low-voltage rectifier. (On an improvised Kinescope mounting in a service shop, another cause for small picture size is due to placing the deflection yoke too far back on the neck of the Kinescope.)

15. **Insufficient width.** In case of insufficient width on 9-inch and 12-inch receivers, check voltage on the 315-volt bus that feeds the 6L6 horizontal output tube. If the voltage is low, change the low-voltage rectifier (5U4G or 5T4) and check heater voltage of this rectifier. Also check the 6L6.

With low line voltage, if the picture width is not sufficient,

(Continued)



(W-93502-1)

Figure 12—Partial Video Chassis Wiring TRK-9 and TRK-12 With Picture AVC. Otherwise same as Figure 13.

Television Service Suggestions (Continued)

the 5V4-G damper tube can be replaced by a 5Z4. This may cause a slight spreading of the picture on the left-hand side.

16. **Picture compressed on left-hand side.** Shrinking of the picture on the left-hand side may be caused by a defective 6L6 horizontal output tube. Also check 6L6 cathode voltage.

17. **Inability to center picture.** This may be due to low voltage across the centering control caused by a defective low-voltage rectifier or low line voltage. Another possibility is that the elements in the Kinescope may be tilted. This can be checked as follows:

With the brightness control at normal setting, turn the receiver on and observe the position of the illuminated spot during the few seconds before the horizontal and vertical deflection voltages start operating. The illuminated spot should be in the center of the Kinescope (its position during these few seconds is not affected by the centering controls). If the spot is off center, it is a definite indication that the Kinescope "gun" is tilted.

18. **Distorted sound or sound in picture.** An open in one side of the antenna transmission line can cause distorted sound. Other possibilities include:

(a) If the sound-IF response curve is not linear for 75 kilocycles on each side of 8.25 mc., distortion will result.

(b) Inaccurate adjustment of the oscillator frequency on any channel may result in no sound or distorted sound, due to the fact that the sound-IF beat frequency will not be 8.25 mc. If the oscillator frequency is too low, the beat note, instead of falling on the high-frequency slope of the sound-IF response curve, may fall on the low-frequency slope. In this case, the sound may be satisfactory, but operation on this side of the curve should be avoided. In some localities, it results in sound image interference from other channels.

A quick and definite method to check the oscillator frequency is as follows:

(a) Tune in a television station.

(b) Turn the fine-tuning trimmer to minimum capacity. This should produce some evidence of sound in the picture. The sound usually appears as horizontal bars of varying density, and these vary in step with the speech or music. The bars disappear when the voice or music stops.

(c) Turn the trimmer for best sound quality. This should correspond to approximately half-capacity of the trimmer.

(d) Turn the trimmer toward maximum capacity. If the slope of the sound-IF response curve is narrow, this will move the beat on to the peak of the response curve, producing low volume and severe distortion.

On service work in the home or where test equipment is not available, if one or more of the oscillator frequencies require readjustment, the recommended procedure is as follows:

(a) Tune in the television station on the channel which requires readjustment of the oscillator frequency.

(b) Turn the fine-tuning trimmer to minimum capacity.

(c) Turn the magnetite-core for the particular oscillator coil toward the highest frequency position (core moved away from the coil). This will definitely put sound in the picture. Turn the core in the opposite direction, to lower the oscillator frequency, until the sound is barely perceptible in the picture. Leave the core in this position.

(d) Now, by turning the fine-tuning trimmer to half-capacity, it should be possible to secure good tone quality with no trace of sound in the picture.

If the sound-IF is deliberately moved into the picture-IF by adjusting the oscillator core to produce the highest frequency, the effect of the sound-IF interference will produce a "reversed" image, somewhat like a film negative.

The customer should be instructed to adjust the fine-tuning control for best sound quality, at which point there is no sound in the picture. If the set is turned on in a cold room, it may be necessary for the customer to readjust the fine-tuning trimmer to compensate for the slight drift in oscillator frequency during the warm-up period.

On all converted receivers, the fine-tuning trimmer is permanently fastened to the fine-tuning control, so that it is not necessary to press in on the control knob. ("C" washers are slipped between the end of the shaft and the rubber drive and cement is used between the rubber drive cone and the cup on the fine-tuning trimmer.)

19. **Insufficient sound.** In locations remote from the transmitter, additional sound volume can be obtained in the 9-inch and 12-inch receivers by eliminating the inverse feedback in the audio amplifier of the radio chassis.

(Continued)

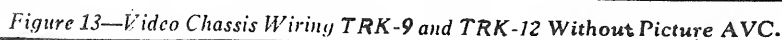
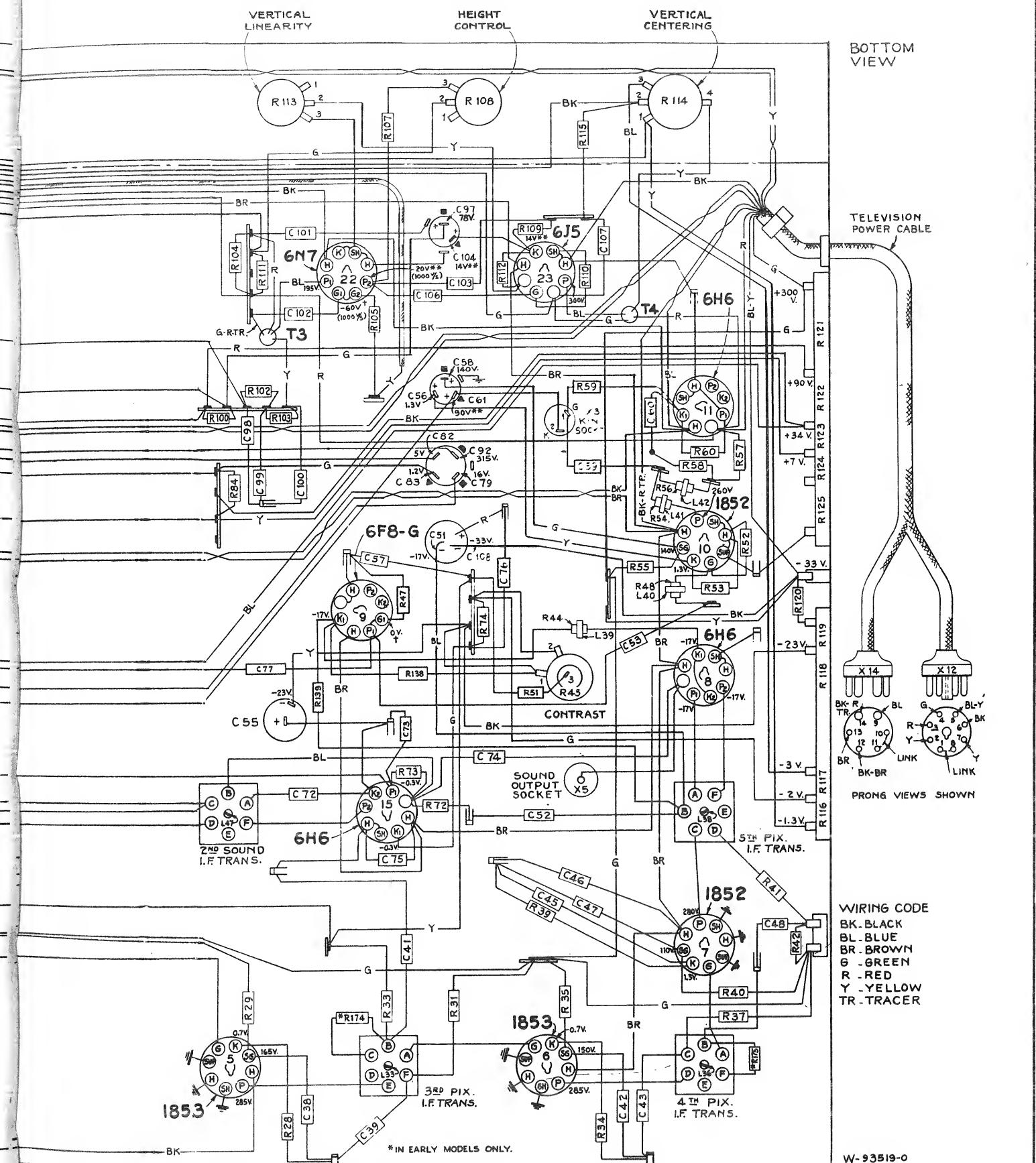
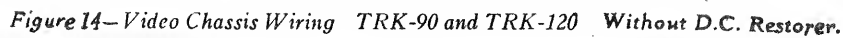
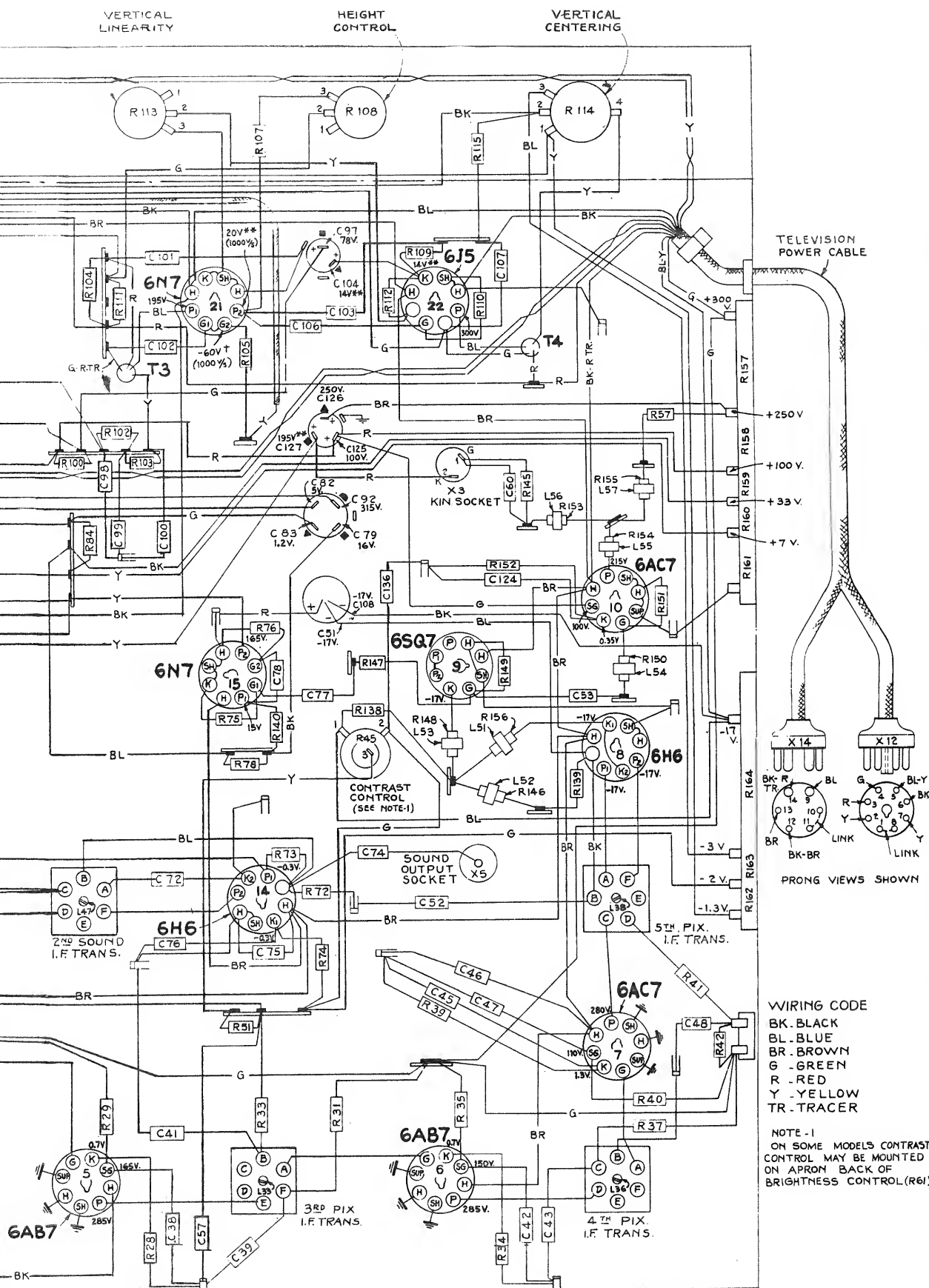


Figure 13—Video Chassis Wiring TRK-9 and TRK-12 Without Picture AVC.







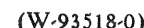


Figure 15—Partial Video Chassis Wiring TRK-90 and TRK-120 With D.C. Restorer. Otherwise same as Figure 14.

The nature or source of RF interference can sometimes be determined by listening in on the output of the picture-IF channel. To do this, connect the input lead of an audio amplifier to the cathode of the picture 2nd-detector load resistor through an .01 mfd. capacitor. Connect the ground of the amplifier to the television chassis. This connection will spoil the picture but permits listening to the audio component in the picture channel. The sound will be a composite of picture, blanking, and sync signals, together with any audio modulation on the interfering station, making it somewhat difficult to pick out and identify the interference. A better method is to use the RCA Chanalyst UHF Converter: Place the input probe on the picture 2nd-detector load resistor and tune the converter through the picture-IF band width

TRK9, TRK90, TRK12, TRK120

(8.75 to approximately 14 mc). The RF interference can thus be picked out and identified.

(To gain experience in recognizing the visual aspect of various forms of interference, it is possible to produce the interference locally and study the results. Sparking motors and similar devices can be operated near the television receiver. A test oscillator can be coupled to the receiver input while a television program is being received. Tune the oscillator to the picture carrier frequency and then shift it up several megacycles to produce a range of beat frequencies with the picture carrier. The oscillator output can be increased and decreased, and modulation can be turned on and off to note the effects.)

21. Failure to operate when installed in cabinet.

- (a) Check for grid shorts in '52 and '53 tubes.
- (b) Check for bent-over pins on the octal plug from video chassis to SPU

TRK-9, TRK-12, TRK-120 for 105-125 Volts—50-60 Cycle Power Supply

General differences are as follows:

Chassis KC-4B, KC-4C, KC-4J

1. Horizontal Damping tube, formerly RCA-5V4G, changed to RCA-25Z6 and socket wiring revised.
2. TRK-9, TRK-12 only: Capacitor C-61 not connected. Its function is performed by an added capacitor C117 (4 mfd.—450 volts).

Chassis KK-7D, KK-7E, KK-7J

1. Capacitors C 118 (80 mfd.) and C 119 (10 mfd.) added in parallel with C-110.
2. Capacitor C-128—TRK-120 or C-120—TRK-9, TRK-12 (0.25 mfd.) added in parallel with resistor R-166—TRK-120 without D.C. Restorer, or R-126—TRK-9, TRK-12, TRK-120 with D.C. Restorer.
3. Capacitors C-113 (0.03 mfd.) and C-114 (0.03 mfd.) changed to C-121 (0.1 mfd.) and C-122 (0.1 mfd.).
4. Power transformer (T-5) changed to (T-8) having a 25v. heater winding to supply the RCA-25Z6 horizontal damping tube.
5. High voltage power transformer (T-6) changed to (T-9).
6. Resistor R-165 is added (TRK-120 only).
7. Inductance L-50 is 100 ohms in these models.
8. An RCA-5T4 is used in these models as low voltage rectifier.

In addition Kinescope shielding is provided as follows:

1. A metallic conical section is installed in the cabinet to shield the Kinescope bulb.
2. A double metallic cylindrical section is installed with the deflecting yoke mounting assembly to shield the deflecting yoke proper. The accompanying illustration shows its assembly.

CAUTION: The conical shield is of the proper size to permit installing the 12AP4/1803-P4 Kinescope with its protective cardboard sleeve. The latter should **never** be removed.

To prevent Kinescope breakage, when installing a Kinescope, the deflecting yoke and shield assembly must be in place. To prevent breakage of Kinescope when removing the deflecting yoke and shield assembly the Kinescope must be removed first.

Replacing or orienting deflecting yoke:

1. Remove Kinescope.
2. Loosen yoke support bracket wing nuts and remove complete yoke and shield assembly.
3. Remove outer shield. Loosen yoke clamp screws to permit removal or orientation of yoke. If it is necessary to orient yoke, pull yoke out so it extends about one inch. Tighten screws just enough to hold yoke but not too tight as it may be necessary to turn it in this extended position. Replace the inner shield and yoke in the yoke mounting brackets.
4. Replace Kinescope and protective glass cover.
5. Move the inner shield and yoke assembly vertically until yoke is gently touching Kinescope bulb. Tighten yoke bracket wing nuts.

22. Interference from harmonics of horizontal deflecting circuits. In 1st-production 9-inch and 12-inch receivers, harmonics of the horizontal deflecting frequency (15.75 kc) may cause interference on nearby radio receivers. In this case, install the following:

- (1) A shielded yoke (RCA Stock No. 9857N). This has a metal pigtail at plug end of cable for grounding under one of the mounting screws on the horizontal output transformer. Unshielded yokes do not have this pigtail.
- (2) A tube shield (RCA Stock No. 12181) on the 5V4G horizontal damper tube. Ground the tube shield to chassis with a pigtail.
- (3) Remove the external ground connection from the television receiver.

6. Rotate yoke carefully with one hand to orient raster or picture.

7. Remove Kinescope.

8. Remove carefully (so as not to disturb yoke adjustment) the inner shield and yoke assembly. Place the latter on a flat surface with the extended yoke end flush to surface. Press inner shield gently down until yoke edge is flush with inner shield edge. Tighten yoke clamp screws evenly by first pulling one up and then the other.

9. Assemble outer shield to inner shield and yoke assembly so bottoms of shields are flush.

10. Replace complete shield and yoke assembly in the yoke support bracket.

11. Replace Kinescope and tighten protective glass cover.

12. Push gently complete assembly up flush against the Kinescope bulb. Tighten wing nuts.

IMPORTANT: 1. The hole in the conical metallic shield must line up with the hole in the protective sleeve to permit connection of the second anode cable.

2. Do not jar or drop the shields and keep away from the loudspeaker field coil to prevent magnetization.

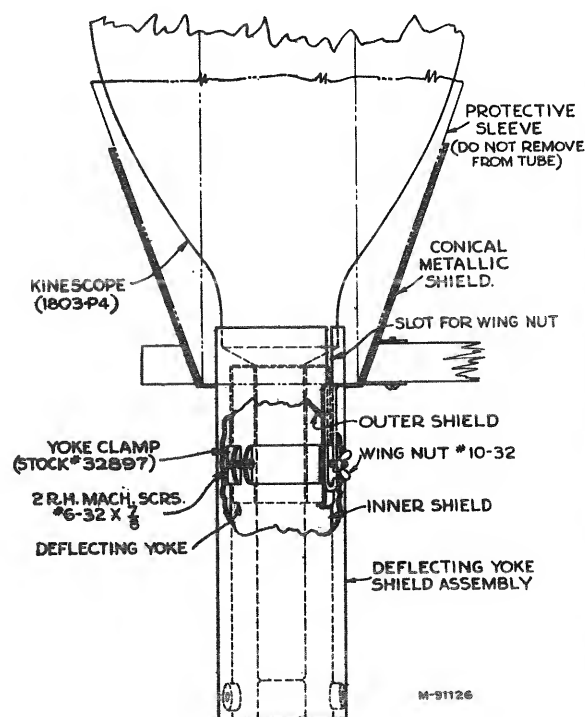


Figure 18—Assembly Details, Showing Kinescope and Deflecting Yoke Shielding

TRK9, TRK90, TRK12, TRK120

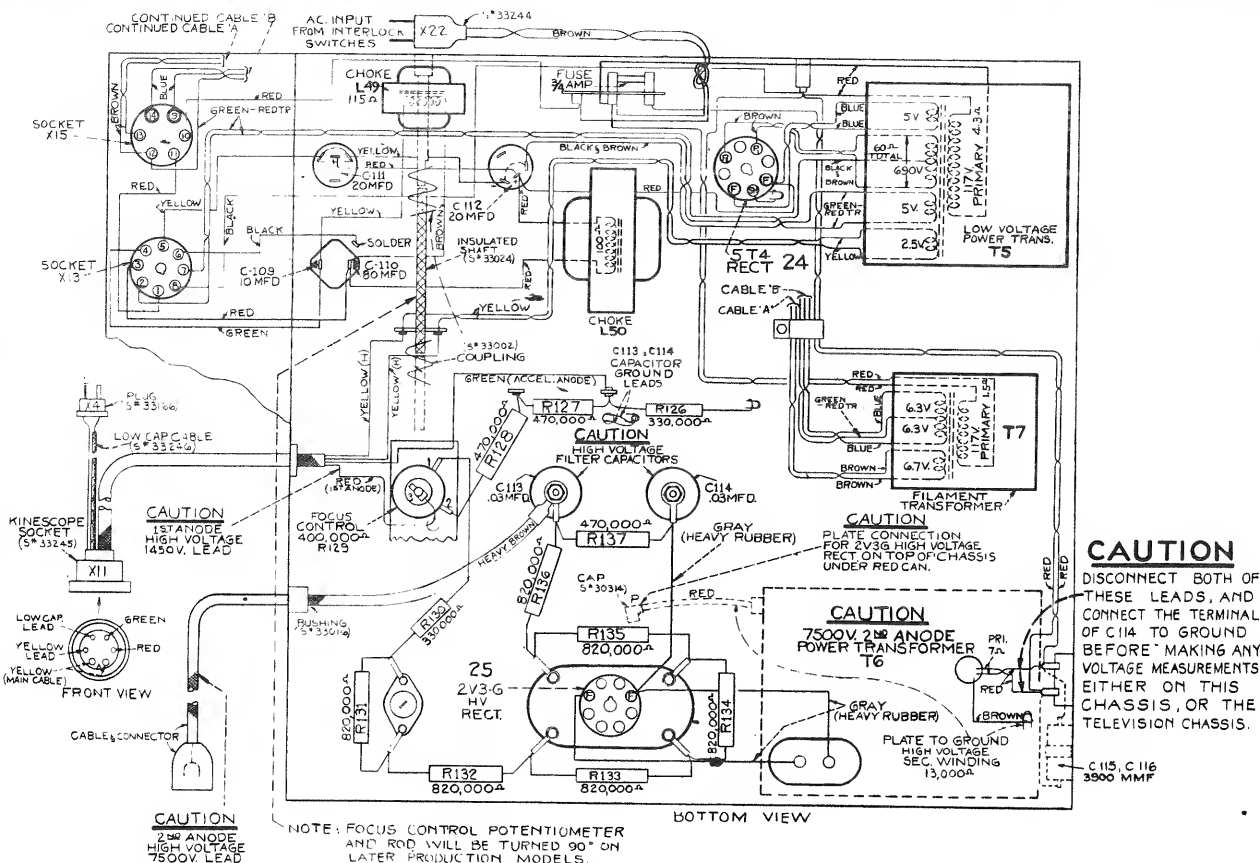


Figure 16—Television SPU Wiring TRK-9 and TRK-12 (60 cycle models)

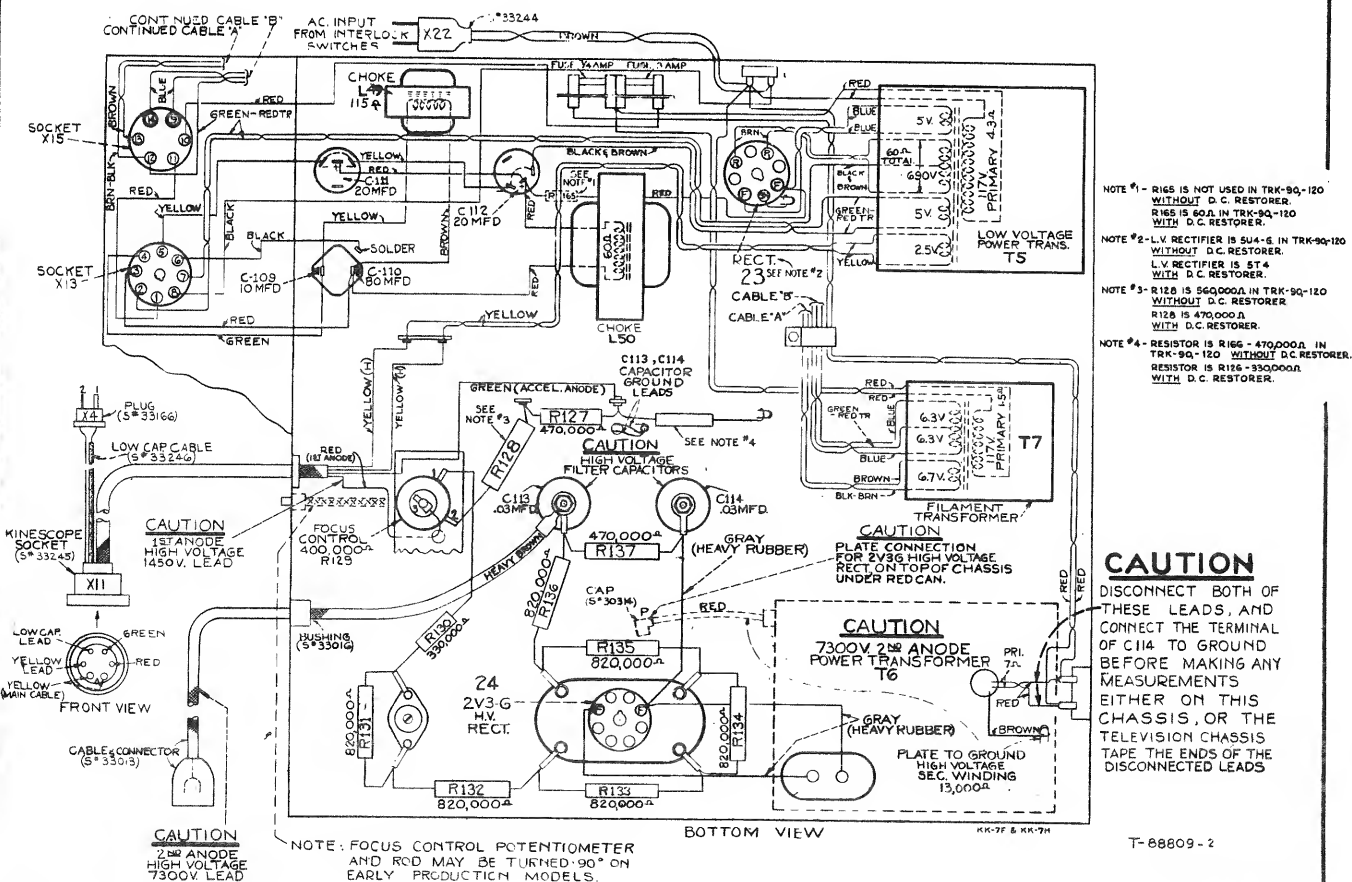


Figure 17—Television SPU Wiring TRK-90 and TRK-120 (60 cycle models)